

clays of New Jersey, besides a number of leaves in parallel horizons elsewhere. Fontaine even describes a leaf under the name *Aceriphyllum* from the Potomac formation of Virginia, the affinity of which, however, is doubtful. The very abundantly preserved flora of the Dakota group contains no true species of *Acer*, although two species referred to *Acerites* have been described. Likewise the abundant flora of the Atane schists of Greenland contains no maples and the Cenomanian of Europe but one species, which is often considered doubtful, so that we may look upon the maples as a dawning type in the Cretaceous days that had long since seen the oak and tulip-tree, magnolia and holly, willow and poplar, sassafras and sycamore.

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REVIEWS

Two new elementary botanical Text-Books

Certainly the teachers of elementary botany cannot complain of the lack of text-books, nor on the whole, may the complaint be extended to their quality. And it is significant that the field covered by recently published works is common, and corresponds closely to the specifications published under the authority of the Society for Plant Morphology and Physiology, and accepted by the Examination Board of the Middle States and Maryland.

Two of the more recently published of these text-books are the "Introduction to Botany" by W. C. Stevens * and "Botany all the Year Round" by E. F. Andrews.† They are similar in scope and as no serious unfavorable criticism may be offered in regard to either, it is my chief purpose to point out the contrasts of treatment.

In the "Introduction to Botany" the approach to the subject is through the study of seeds and seedlings, a method in very general acceptance. The disadvantage of doing in this way becomes apparent in the study of the "grain" of Indian corn,

* Pp. v + 436 + 127 (Flora). Boston, D. C. Heath, 1902.

† Pp. 302. New York, American Book Company, 1903.

which is rather unsatisfactory, since by beginners it is easily mistaken for a seed. For this reason I have elsewhere advocated the use of other fruits together with their seeds. Some good physiological work on respiration and on food and its use, is introduced. The experiment on the responses of roots to the gravitational stimulus appears to be defective, the directions calling for the "hour-hand spindle," which revolves once in twelve hours — far too long a period, and much greater than the reaction time of the tap-root of the seeds used. Even the minute-hand spindle moves too slowly for good results. Ecological matters are then taken up. A similar plan is adopted for roots, buds, stems and leaves, and, while a fair amount of physiological work is called for, and many good points are brought in, the educational value of the whole is chiefly informational. There is not quite enough stress laid upon independent thought by the pupil, the text for the most part working out the problems. A chapter on "Growth and Movement" follows, which, though in many ways very good, is rather too difficult and technical for the average high school pupil. Sachs' experiment on hydrotropism, it may be said, is not the best in method that has been devised. The most striking part of the book is that concerned with the "flower," and a distinctly pleasant flavor is given to it by the reference to Sprengel's work, and by the good illustrations. The matter of historical allusion has, I believe, been entirely too much overlooked in elementary work. Stevens, and earlier, Bailey, in his "Lessons with Plants" (pp. 427 *et seq.*), have therefore done a service in using it. The introduction, too, of a critical study of insects in their relations to flowers, gives the subject a far more scientific trend than is usual. The following part of the book treats of types of all the leading groups of plants, and with general adaptation, and does not call for special mention. The chapter on "Plants of Past Ages" is brief, but good, and leads one to believe that the discussion might profitably be more prolonged and further illustrated.

The illustrations are evenly new and good — with isolated exceptions of no great moment — and the successful use of well-chosen photomicrographs — as *e. g.* of starch grains on pp. 20

and 21 — and of photographs, and this, too, without compelling the user of the book to carry around a heavy mass of clay-filled paper, is to be commended. The use of simple diagrams deserves similar praise. A flora completes the volume. Some chapters devoted to equipment and methods increase its usefulness.

In "Botany all the Year Round" the leaf is the starting point, the author finding that this is the most convenient on account of the availability of material, and because the leaf is so "important and fundamental" a part of the plant as to justify its use in this way. Fruits, seeds and seedlings, roots and underground stems, stems "proper," buds and branches, and the flower are taken up in the order named. The chief features of note are the practical questions and suggestions for field work which are so planned as to call for vigorous thought on the part of the student, and at the same time he will often gain thereby much useful information for practical living, as well as mental discipline. That the questions are sometimes unfortunate in their wording is a criticism which every teacher who has attempted to embody his method in writing will be loath to press. Aside from this, these questions and suggestions alone justify the book, and will make it a stimulating guide to study. The parts of the book on ecology and types — the latter especially — are too brief for the comfort of many teachers of elementary botany in the high school. The studies of types are a bit too desultory — at least such is the impression one gets — but withal there is relatively a considerable amount of effort by the pupil called for. The illustrations are for the chief part simple but good, some being the work of high school students. The whole represents the idea of a good, vigorous teacher. The book is thin and light, the paper exceptionally good and press work excellent. Indeed, the two books here briefly, and perhaps superficially, reviewed, are a demonstration that many publishers have missed the mark by a wide flight in making use of heavily calendered, stiff and badly odorous papers.—FRANCIS E. LLOYD.